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MANUFACTURE OF SMALL DIMENSION STOCK A NEW RURAL INDUSTRY.

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FOREWO

This little booklet is one of a series of popular publications which are being issued from time to time by the Timber Development Section of the Forest Research Institute at Dehra Dun. A list of other booklets issued or to be issued is given at the end of this publication.

In the past, steel and concrete have been looked upon as the chief structural materials of the engineer. This has been due to the fact that these two materials have been widely advertised and strongly assisted by powerful organisations, whereas wood being nobody's child has gone by default.

Recently in some advanced countries there has been a distinct change in favour of wood, and engineers are discovering that far from being only an unimportant auxiliary, wood is the most economical and practical material for many modern structural purposes.

There are two reasons for this change. The first is that wood can now be made durable for a very long period, and the second is that new ideas in timber joints and wood structures have been evolved which place wood on a very different footing to that of twenty years ago. If the question of primary and recurring costs are considered, increased use of wood as a structural material is also justified.

In conclusion, it is a well known axiom that there is a right place and a wrong place for everything, and it is not the intention that wood should be looked upon as the favoured and pampered child of wealthy parents. All we ask is that it should be given a fair hearing and that engineers "honestly and without prejudice" should consider the ideas presented in these booklets, use their own special qualifications to check them up and give treated timber the same consideration as they give to other structural materials. The Forest Research Institute will welcome their help and co-operation for it holds that timber can stand on its own merits and in not a few cases will be found still standing when other materials have fallen.

H. TROTTER,
Forest Economist,
Forest Research Institute.

DEHRA DUN;
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MANUFACTURE OF SMALL DIMENSION STOCK AS A RURAL INDUSTRY

BY

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Both the Government and the politicians of India have on the anvil the framing of a comprehensive programme of rural uplift. As many ills in India, especially in villages, are due to the chronic and appalling poverty of the villager, any proposal that is calculated to improve his earning capacity deserves careful consideration.

The writer was recently engaged in advising the Government of an important Indian State on timber utilisation, and he worked out an idea that bids fair to be practicable and applicable to most Indian villages. The idea relates to the manufacture of " small dimension stock " by practically unskilled labour in rural areas. Such a manufacture capitalises only what the illiterate villager is capable of since all that is necessary is the purchase and use of a hand saw and a wood axe.

The expression "small dimension stock" originated in the United States of America. It refers to wood pieces of different standard sizes, generally varying in thickness and width between ½" and 6" and in length up to 8 feet. This stock has a ready market in towns and cities where wood-working factories or workshops, including turneries, may be, or are already located. The stock may be straight and rectangular in cross-section, or it may be curved or bent and may be of different cross-sectional and longitudinal dimensions. In more general terms, small dimension stock is wood planking of small sizes that can be cut from slabs and trimmings, or pieces from small logs or branches of different irregular sizes. It finds its chief market in wood-assembling and finishing factories. In India, the small dimension stock idea is already current although only in an embryonic form (wheel parts and bed-legs), but a more scientific, systematic and extensive production of small dimension stock has enormous potentialities for the elimination of timber waste to a minimum, and for starting a new rural industry of far-reaching importance. As far as the aspect of the rural production of small dimension stock is concerned, the average villager can

produce only the more simple forms with rough finish, like blanks for turnery work, legs of chairs, tables, etc. The more skilled artisans of Indian villages, like the village carpenter, can also plane the stock, or turn the blanks into different useful forms for chair legs, toys, brush-handles, curtain rods, etc. It may be added that although small dimension stock is cut from small logs, it is a higher grade of material (with neither knots nor decay) than structural timber or large dimension stock.

There are various sources of raw material for the manufacture of small dimension stock. The small and irregular pieces of timber left over during conversion of large logs into sleepers, building timber, and also branch wood are important sources. Such pieces are now usually consigned to the fire. In some parts of the country, especially in the drier regions of India, there are several valuable species of trees which either give only a straight bole that is short, or a clear bole of comparatively small diameter, say below 12″ or 14″. In the case of conversion of the larger logs, the smaller sized tree-tops, edgings, slabs, trimmings, etc., form excellent material for the manufacture of small dimension stock. Crooked or small-sized stem or branch logs, slabs, and edgings contain different proportions of small dimension stock which can be cut out just as well from such low-priced material as from high-priced large-sized logs.

The next aspect that requires consideration is the scope that exists for the use of small dimension stock. Obviously, any one who employs timber articles or minor structures, in the final form of sizes not larger than 6″ × 8″ in cross-section, and not longer than 8 ft. will buy such material if it is cheap. Practically any kind of wood, hardwood or softwood, that is available in the forest will be suitable for the purpose, and as the material is manufactured with inexpensive rural labour from waste timber, it should be easily able to compete with such stock cut in towns and cities by expensive labour from costly large-sized logs.

It is no exaggeration to say that over 95 per cent. of the timber that is required in practically any wood-using industry is included within the limits of size of small dimension stock.

In an actual survey of timber used in wood industries in America, it was revealed that only 1 per cent. is employed in over 5 inches width or thickness, and over 8 ft. in length. Again, over 50 per cent. of the timber used in American wood industries was found to be less than four inches square and two feet long. It would, therefore

appear that there is a very large field for the use of small dimension stock in wood industries. The manufacturer of such stock requires the most elementary skill, and only the poorer grades of timber.

Some of the consumers of small dimension stock in wood-using industries may be classified as follows :—

1. Buyers of many different but small sizes, *e.g.*, furniture makers.
2. Wood turners who require blanks, *e.g.*, furniture makers, toy makers, brush and tool handle makers, insulator pin and shuttle makers.
3. Users of bent timber, *e.g.*, furniture makers and makers of sporting goods.
4. Buyers of timber in different stages of finish and assembly, *e.g.*, furniture makers, toy makers, cart and wagon makers, truck makers.
5. Industries in which standard sizes are employed, *e.g.*, wood barrel stock, box and crate shooks.
6. Buyers requiring air-dry pieces, *e.g.*, furniture makers, door and window-makers.
7. Users requiring certain types of cutting or sawing, and, in some cases, certain qualities, *e.g.*, furniture makers and sliced veneer users.

In Germany, Austria, Czechoslovakia, and Holland, to mention a few among the European countries, the use of small dimension stock has become extensive. Japan has followed suit, and she is importing into India small dimension stock for packing cases and crates. She has been making tennis rackets with small waste pieces of different timbers.

The following are some of the more important wood industries that can employ small dimension stock on a large scale.

1. Makers of agricultural implements like ploughs.
2. Makers of tonga and cart spokes, and their parts like felloes, hubs, etc., wheel barrows, trucks, motor car bodies and wheels, etc.
3. Makers of boxes, crates, barrels, poultry coops, sign and advertising boards, patterns, templates, tubs, water tanks, etc.
4. Makers of sporting goods like tennis and badminton rackets, hockey sticks and cricket bats, poles, etc.

5. Makers of chairs, benches, stools, book-shelves, tables and other articles of furniture, etc.
6. Makers of handles of brushes, brooms, cross-arms for electric poles, garden and machine tools, etc.
7. Turnery workers making shuttles, spools and bobbins, woodenware and novelties, toys, patterns, flasks, etc.
8. Makers of small machines like spinning wheels, weaving machines, framework for sugarcane crushers, etc.
9. Makers of doors, windows, ventilators, panel as well as trellis partitions, wall-brackets, shingles, casing for electric work and house-building components.
10. Miscellaneous small-sized wood-ware like door knobs, parts of indoor games, like chessmen, draughts, etc., curtain-rods, shoe-lasts, paper-weights, blotters, cups and saucers and also for articles for which blanks are required to enable manufacture on a large scale in automatic or semi-automatic machines.

Having surveyed briefly the field of use for small dimension stock, the question of its manufacture and disposal in Indian villages may be considered.

Man is a victim to tradition, style and habit. The Indian villager is no exception. He has been used to selling timber mostly in the form of logs, scantlings and *ballas*, for building construction, and railway sleepers. If he is to start making small dimension stock, he must be naturally convinced that it is profitable to do so. As far as the manufacture of small dimension stock in Indian villages is concerned, there are really only two aspects to be considered, as under the present conditions of poverty and lack of education of the Indian villager, one cannot expect him either to purchase and instal machinery, or perform complicated wood-working operations even with his hands. The villager's ability to invest only a very few rupees of capital and his poor ability as an artisan are two potent factors that must circumscribe any industry that may be prescribed for him.

At the present time, it is only possible to expect him to use a hand-saw, which costs less than two rupees. It is also a tool which lasts for a long time without being easily damaged provided the village carpenter sharpens its teeth with a file occasionally. The average village carpenter is able to do this work. The villager can, therefore, prepare rough-sawn stock from slabs and edgings left after the conversion of logs into sleepers and scantlings, etc., which may be bought for a small sum of money. He can also cut such stock

from poor logs (either of tree stems or branches) or of small girth. The larger logs can be converted into planking.

The villager can purchase crooked and knotty logs from the neighbouring forest, and after cutting out the defective portions, he can make the best grades of small dimension stock. In north-west Bombay Presidency, Central Provinces, Bihar and in the Central Indian States, the trees are of stunted growth so that the boles are usually crooked. Such logs fetch at present a very low price. There is also the branch wood of timbers like shisham. As they will be ideal for the preparation of small dimension stock, the royalty on them is bound to improve considerably with its increasing use for small dimension stock. Automatic machines cannot easily compete with man for such cutting out of defective portions, etc., with the minimum of waste. The human brain alone can exercise the necessary judgment. Here is an excellent field for the Indian villager to employ his leisure time for improving his earning capacity, as even the French and German farmer does during the months when farming does not occupy his time. The Indian villager has at least 160 days in the year when he has hardly anything to do on the land.

The skilled village carpenter or village-turner can make the more complicated or finished forms of small dimension stock like bent or curved stock for felloes or tonga rims, certain toys, sporting goods, etc., and also turned articles such as ornamental legs for chairs, beds, etc., toys, chessmen, wood tops, yo-yo, cups, etc. It is well-known that there are dotted throughout the country several villages where there are professional wood-turners who even now turn out articles of excellent finish with comparatively simple and crude locally-made tools.

It has been found, in actual studies, that in small-sized logs, when cut in machines to their full length, the waste may vary between 30 and 50 per cent., whereas if the same logs are first cross-cut into shorter lengths, and rectangular flitches are then cut out, the total waste drops down to 10 or 15 per cent. This is easy to appreciate.

The following are some of the advantages of sawing small dimension stock from crooked and knotty logs over converting them into planks :—

1. Less skill required.
2. Less waste.
3. More accurate cutting.

It may be stated, however, that the villager should examine the boles carefully, and decide wisely as to where he can cross-cut the logs with advantage. Such knowledge becomes more perfect with time and experience if once a start is made under proper guidance.

The next question that arises is "What are the most easily marketable sizes, and what is the order of such sizes." In the unorganised condition of timber industries in India, it is very difficult satisfactorily to answer the question, but an attempt may be made based on the experience of various other countries of the world. There are really two aspects to be kept in view. Firstly, there are slabs and edgings left after converting logs into sleepers. These are available in most parts of Northern India, and on the West Coast. Secondly, there are short crooked or small-sized logs or branch wood which are available in all the drier regions of the country.

The following are some of the sizes (given in the approximate order of importance) that can be cut out from hardwood slabs remaining after conversion of logs into scantlings and sleepers :—

2″ × 2½″ × 6′
1½″ × 2″ × 2′-6″
1¼″ × 2½″ × 2′-6″ and 5′
1″ × 1½″ × 2′-6″ and 1′-6″
1″ × 1″ × 1′-6″.

Railway sleepers may be manufactured from logs, wherever it is possible to do so, since there is not only a ready market for sleepers but all the defects are centralised in one unit, and there is a minimum of sawing and other labour per unit volume. The slabs and edgings may be employed for manufacturing small dimension stock.

In the case of the second class of material that fetches a poor price at present—namely, small-girth logs, some of which may be short or crooked, the following sizes may be cut with advantage :—

5″ × 4″ × 7′ and 4′-6′
4″ × 4″ × 7′ and 4′-6″
4″ × 2″ × 7′ and 4′-6″
3½″ × 4″ × 6′ and 3′
3″ × 3½″ × 6′ and 3′
3″ × 3″ × 3′.

The above sizes will be useful for the larger parts of furniture, carts and wagons, doors and windows, cross-arms for overhead electric

distribution, etc. The square cross-section pieces are useful for turnery work.

The third general class of material that is available from the Indian forests consists of fairly straight lengths, but of low girth, of timber which may be used very profitably (without any cutting or waste) for fence posts, flooring timber, bridges overhead electrical supports after suitable chemical treatment. We are not concerned, however, with this class of material as there is no conversion and no waste.

Usually in cutting stock of the largest size grades, defects will prevent material going into such sizes. The defective sticks may be cut into the next smaller size, and so on, so that all the stock pieces are very sound. The smallest size stock will, therefore, be the last size to cut. Also, when accepting an order for the supply of the larger sizes, there may be a stipulation made that a certain minimum of the smaller sizes, say 20 per cent., should be purchased. In the case of rural manufactured small dimension stock, the villages should be allowed to supply the small sizes, the exact proportion of such sizes depending on local conditions. That is what some of the European small dimension stock manufacturers do.

It will be seen that in the two main types of conversion proposed, in one case there is the manufacture into small dimensions of only a part of the logs—in fact, that which is sold usually for fuel at present—consisting mostly of sapwood slabs. They should be treated with a suitable wood preservative after being cut into small dimension stock as, otherwise, the wood is likely to be attacked by fungus and borers. In the other type of conversion, the whole log is utilised for making small dimension stock. Most of the hardwoods of India, especially of the drier regions, can best be utilised by converting them into small dimension stock in villages. It is practically only with sal and with woods like venteak, irul and other Malabar woods that the first type of conversion deserves consideration. In the wet deciduous forests of the West Coast, Bengal and Assam, large-sized logs of *Terminalia* sp. (laurel) *Dipterocarpus* sp. (gurjan), etc., are available, so that after taking out large-sized timbers for sleepers, building construction, etc., the rest (including branch wood which is now left to rot) may be converted into small dimension stock, bearing in mind that the largest sizes of the small dimension stock must be cut out first.

Before the very important question of marketing small dimension stock is considered, two of the chief difficulties in the way, namely standardisation and seasoning, deserve examination.

The first requires co-operation and co-ordination between the rural and urban workers. It is the latter skilled labour that should find it convenient and profitable to purchase the rough-sawn small dimension stock so that it can, either by hand or by machinery, assemble and finish it into manufactured and finished articles. As has been already stated, the urban skilled artisan can get the blanks for his work at a lower cost than that at which he can produce the small dimension stock from large-sized logs. In fact, in many cases, it does not pay the town-skilled labour to convert slabs, edgings, small-sized and crooked logs into small dimension stock as they have to pay higher rents, and more freight on such waste material. Also, their standard of living is higher, and they expect higher wages and profits than the villagers. If the stock is manufactured right near the forests in the villages, the handling and freight charges on the waste material left after the small dimension stock has been extracted is saved. If the small dimension stock is sold to the agents of town workers after it has been seasoned in small sizes in the villages, the weight of the wood to be handled and transported will be less.

There is a further advantage that for the same weight of slabs, edgings, crooked logs, etc., only about half the space will be required to carry the rectangular sawn small dimension stock, as the latter can be packed compactly (almost solidly) in carts or lorries for transport to towns.

As far as the difficulties in standardisation are concerned, there should not be much trouble in India. For example, in furniture manufacture, very few people are punctillious as regards style and fashion. As long as it is a comfortable and strong piece which is not expensive, practically any type of furniture, or any other wood article, finds a ready sale in India. The majority of people are too poor to be able to pay for æsthetics even if some of them have such ideas, so that the question of low cost and serviceability are the two most paramount considerations for the wide sale of anything in India.

With reference to the second difficulty, namely seasoning, this should not be very serious, as timber in the smaller cross-sectional sizes of small dimension stock dries quickly and easily and without much degrade, provided the pieces are piled in tiers, providing channels for air to circulate freely. Those timbers that are prone to split badly should be piled closer so that the rate of evaporation of moisture from the wood is retarded. The average Indian villager

has enough common sense to do this properly if a little guidance is given.

In the marketing of small dimension stock which could be made a lucrative rural industry for some years to come, there should be *liaison* agents or salesmen to facilitate a prompt and profitable disposal of the rural production. The great difficulty lying in the path of the adoption of the scheme proposed by the writer lies in obtaining the proper type of such agents, who should be given a special training, which could if necessary be arranged at the Forest Research Institute, Dehra Dun. The agent should not only understand the various physical, mechanical and working properties of the more important Indian woods, but should study the precise need of the town wood-workers and finishers. Otherwise, he can neither persuade the villager to produce the small dimension stock, nor can he find a profitable sale for it so that the whole scheme breaks down. Good salesmanship requires a thorough knowledge of the product sold, besides all the usual qualifications such as tact, persuasiveness and honesty required for selling.

One of the first difficulties that the salesman has to encounter is about the price that can be realised for the small dimension stock. The salesman should explain the position to the urban hand or machine worker, and convince him that he is getting ready-made rough-sawn stock cheaper than he can produce it by cutting logs that are usually transported at considerable cost to towns where they are sawn by expensive labour, a lot of the timber being also rejected as waste. He should show the villager that he is getting a decent wage for his labours during the slack days of the year. Until public opinion is created and a powerful all-India organisation comes into existence for the standardisation of parts of wood products (as has been done with metal parts in such articles and machines as motor cars, cycles, boilers, air pumps, etc.), the sale of a high proportion of small dimension stock will be more confined to actual orders booked than to stock manufactured in villages. In Bareilly, one of the most important centres of furniture-making in the United Provinces, there are certain standard designs of furniture made that command a wide market. The result is that the Bareilly worker can compete with other workers even hundreds of miles away as regards certain standard types. As it is the idea of the writer of this pamphlet that the manufacture of small dimension stock should be essentially a rural industry to augment the earning capacity of the villager, it is hoped that the Government and people with public spirit will arrange for the training of the *liaison* salesman, who

holds the key to the success of the whole scheme. The scheme may be tried, to start with, in a few areas as an experiment. It may be extended later if it works out satisfactorily. The small producer in the villages requires to be told what sizes he has to produce, and should be paid promptly when he offers the stock. The scheme may be immediately tried in some localities where efficient organisations exist on a co-operative basis. There is ample scope for the Government (including the Forest, Agriculture and Industries departments) as well as for the popular organisations aiming at rural uplift to work the scheme. The very keystone for the scheme lies in the villager being saved the worry of finding a market for the shapes and sizes he can produce with the minimum of investment of capital and with very little mechanical skill, and he should be promptly paid for the products of his labour. By the inauguration of a scheme like the one proposed, the country, as a whole will be gaining by not only reducing timber waste to a minimum and enriching the villager, but in creating a new rural industry that can compete successfully for a long time to come with the machine and the capitalist.